



# TYPE CK6186

*Excellence in Electronics*

The type CK6186 is a sharp cutoff pentode of miniature construction with a high gm, and low input and output capacitances. It is designed for use as an intermediate frequency amplifier or as an RF amplifier of frequencies up to 400 megacycles. Through the use of two (2) cathode leads, isolation of input and output circuits is made feasible.

## MECHANICAL DATA

ENVELOPE: T-5 1/2 Glass (6-2)

BASE: Miniature Button 7-Pin, E7-1

### TERMINAL CONNECTIONS:

Pin 1 Grid #1  
Pin 2 Cathode; Internal Shield;  
Grid #3  
Pin 3 Heater

Pin 4 Heater  
Pin 5 Plate  
Pin 6 Grid #2  
Pin 7 Cathode; Internal Shield;  
Grid #3

### MECHANICAL RATINGS:

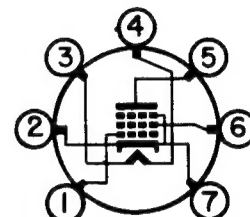
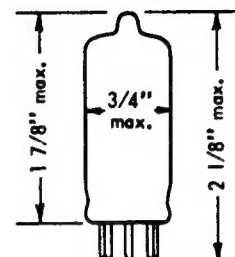
Maximum Impact Acceleration (Shock Test—Note 2)  
Maximum Vibrational Acceleration (96 Hour Fatigue Test—Note 3)  
Maximum Bulb Temperature

450 G  
2.5 G  
165 °C

MOUNTING POSITION: Any

## ELECTRICAL DATA

CAUTION—To Electron Equipment Design Engineers: Special attention should be given to the temperature at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy maybe reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if maximum ratings are exceeded. Both Reliability and Performance will be jeopardized if filament voltage ratings are exceeded. Life and Reliability of Performance are closely related to the degree that regulation of the heater voltage is maintained at its center rated value.



BOTTOM VIEW

7BD

RATINGS AND NORMAL OPERATION:	MIL-E-1 SYMBOL	ABSOLUTE MINIMUM	NORMAL TEST CONDITIONS (Note 5)	NORMAL OPERATION (Note 4)	ABSOLUTE MAXIMUM	MIL-E-1 UNITS
Heater Voltage (Note 6)	Ef:	5.7	6.3	6.3	6.9	V
Plate Voltage	Eb:	----	250	250	330	Vdc
Grid Voltage	Ec1:	----	0	0	----	Vdc
Grid #2 Voltage	Ec2:	----	150	150	250	Vdc
Heater Cathode Voltage	Ehk:	----	----	----	100	V
Cathode Resistance	Rk:	----	200	200	----	Ohms
Plate Dissipation	Pp:	----	----	1.75	2.5	Watts
Grid #2 Dissipation	Pg2:	----	----	0.3	0.55	Watts
Transconductance	Gm:	----	----	5000	----	μmhos
Plate Current	Ib:	----	----	7.0	----	mA <sub>dc</sub>
Grid #2 Current	Ic2:	----	----	2.0	----	mA <sub>dc</sub>
Cathode Current	Ik:	----	----	9.0	----	mA <sub>dc</sub>

Tentative Data

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## MINIATURE PENTODE

## ELECTRICAL DATA (Cont'd.)

## CHARACTERISTICS AND QUALITY CONTROL TESTS (NOTE 1)

TEST	CONDITIONS	AQL %	MIL-E-1 SYMBOL	MIN	LAL	BOGIE	UAL	MAX	ALD	MIL-E-1 UNITS
<b>MEASUREMENTS ACCEPTANCE TESTS, PART 1</b>		<b>Combined AQL=1.0% excluding Mechanical and Inoperatives</b>								
Heater Current:		0.65	If:	275	----	300	----	375	----	mA
Heater Cathode Leakage:	Ehk=+ 100 Vdc Ehk=- 100 Vdc	0.65	Ihk; Ihk:	----	----	----	----	10 10	----	$\mu$ Adc $\mu$ Adc
Grid Current (1):		0.65	Ic1:	----	----	----	----	-0.1	----	$\mu$ Adc
Plate Current (1):		0.65	Ib1:	5.2	6.3	7.0	7.7	8.8	1.5	mAdc
Screen Current:		0.65	Ic2:	1.3	1.7	2.0	2.3	2.7	0.6	mAdc
Transconductance (1):		0.65	Sm (1):	4000	4625	5000	5375	6000	850	$\mu$ mhos
Continuity and Shorts: (Inoperatives)		0.4	----	----	----	----	----	----	----	----
Mechanical:	Envelope: T-5 1/2 (6-2)									
<b>MEASUREMENTS ACCEPTANCE TESTS, PART 2</b>										
Insulation of Electrodes:	Ef= 6.3 V Eg1-all= -100 Vdc Ep-all= -300 Vdc	2.5	Rg-all: Rp-all:	100 100	----	----	----	----	----	Meg. Meg.
Plate Current (2):	Rk= 0; Ec1= -4.5 Vdc	2.5	Ib (2):	5.0	----	----	----	----	----	$\mu$ Adc
Plate Current (3):	Rk= 0; Ec1= -10 Vdc	2.5	Ib (3):	----	----	----	----	100	----	$\mu$ Adc
Transconductance (2):	Ef= 5.7 V; (Note 7)	2.5	$\Delta$ Ef Sm (2):	----	----	----	----	15	----	%
Grid Emission:	Ef= 7.0; Rg1= 0.1 Meg; Preheat 5 minutes at Ef= 7.0 Vdc	2.5	Isc:	0	----	----	----	-0.2	----	$\mu$ Adc
RF Noise:	Ec1= -2 Vdc; Ecal= 15.0 mVac; (Note 8)	2.5	----	----	----	----	----	3.0	----	mW
Noise and Microphonics:	Ef= 6.3 Vac; Ehk= 0; Ebb= Ecc2= 300 Vdc; Rg2= 0.6 meg; Rp= 0.01 Meg; Rk= 200; (Note 9) Ck= 1000 $\mu$ f	2.5	EB:	----	----	----	----	50	----	mVac
Capacitance:			Cg-p:	----	----	----	----	0.03	----	$\mu$ f
Capacitance:	No Shield	6.5	Cin:	5.2	----	----	----	7.8	----	$\mu$ f
Capacitance:			Cout:	1.3	----	----	----	2.3	----	$\mu$ f
Low Pressure Voltage Breakdown:	Pressure= 55 $\pm$ 5 mmHg; Voltage= 500 Vac	6.5	----	----	----	----	----	----	----	Vac
Vibration (2):	Rp= 2000 ohms; F= 25 cps; G= 2.5	6.5	Ep:	----	----	----	----	100	----	mVac
<b>DEGRADATION RATE ACCEPTANCE TESTS</b>										
Shock:	Hammer Angle= 30°; Ehk= 100 Vdc, Heater Positive; Rg1= 0.1 meg; Note 2	----	----	----	----	----	----	----	----	----
Fatigue:	96 Hours; G= 2.5; Fixed Frequency; F= 25 min., 60 max., Note 3	6.5	----	----	----	----	----	----	----	----
Post Shock and Fatigue Test End Points:		----	----	----	----	----	----	----	----	----
Vibration (2):		----	Ep:	----	----	----	----	450	----	mVac
Heater Cathode Leakage:	Ehk=+ 100 Vdc Ehk= -100 Vdc	----	Ihk; Ihk:	----	----	----	----	30 30	----	$\mu$ Adc $\mu$ Adc
Transconductance (1):		----	Sm:	3500	----	----	----	----	----	$\mu$ mhos
Grid Current (1):		----	Ic1:	0	----	----	----	-0.2	----	$\mu$ Adc
Glass Strain (Thermal Shock):		2.5	----	----	----	----	----	----	----	----

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## MINIATURE PENTODE

## ELECTRICAL DATA (cont'd.)

## CHARACTERISTICS AND QUALITY CONTROL TESTS (Note 1) (cont'd.)

TEST	CONDITIONS	AQL %	MIL-E-1 SYMBOL	MIN	MAX	MIL-E-1 UNITS	Allowable per Characteristic 1st Sample	Defects Combined Samples
ACCEPTANCE LIFE TESTS								
1 Hour Stability Lift Test:	Ehk= 100 Vdc, Heater Positive; Rg1= 1.0 meg; TA= room	----	----	----	----	----		
1 Hour Stability Life Test End Points:	(Typical Sample Size= 50 tubes)							
Transconductance (1) Change of individual tubes from initial:		1.0	$\Delta_f Sm$ :	----	10	%		
100 Hour Survival Rate Life Test:	Ehk= 100 Vdc, heater positive; Rg1= 1.0 meg; TA= room; Min Bulb Temp.=+ 165° C	6.5	----	----	----	----		
500 and 1000 Hours In- termittent Life Test:	Ehk= 100 Vdc; Heater Positive; Rg1= 1.0 meg; Min. Bulb Temp.= + 165° C	----	----	----	----	----		
500 Hour Intermittent Life Test End Points:	(Typical sample size= 20 tubes 1st sample, 40 tubes 2nd sample)	----	----	----	----	----		
Inoperatives:		----	----	----	----	----	1	3
Grid Current (1):		----	Ic1:	0	-0.1	$\mu$ Adc	1	3
Heater Current:		----	If:	275	325	mA	1	3
Heater Cathode Leakage:	Ehk=+ 100 Vdc Ehk= -100 Vdc	----	Ihk: lhk:	----	10 10	$\mu$ Adc $\mu$ Adc	1	3
Transconductance (1):		----	Sm:	3750	6000	$\mu$ mhos	1	3
Transconductance (2):	(Note 7)	----	$\Delta_{EF} Sm$ :	----	15	%	2	5
Electrode Insulation: (p-all) (g-all)		----	Rp-all: Rg-all:	50 50	----	Meg. Meg.	2	5
Transconductance (1) Average Change:		----	Avg. $\Delta_f Sm$ :	----	15	%	---	---
Total Defectives:		----	----	----	----	----	4	8
1000 Hour Intermittent Life Test End Points:	(Typical Sample Size= 20 tubes 1st sample, 40 tubes 2nd sample)	----	----	----	----	----	---	---
Inoperatives:		----	----	----	----	----	2	5
Grid Current (1):		----	Ic(1):	0	-0.1	mAdc	2	5
Heater Current:		----	If:	275	325	mA	2	5
Transconductance (1):		----	Sm:	3500	6000	$\mu$ mhos	2	5
Heater Cathode Leakage:	Ehk=+ 100 Vdc Ehk= -100 Vdc	----	Ihk: lhk:	----	10 10	$\mu$ Adc $\mu$ Adc	2	5

Note 1: Characteristics, Quality Control Test Procedures, and Inspection Levels are made according to the appropriate paragraphs of MIL-E-1 "Inspection Instructions for Electron Tubes" and MIL-STD-105A.

Note 2: Test Conditions and Acceptance Criteria per Shock Test Procedures of MIL-E-1 basic specifications.

Note 3: Test Conditions and Acceptance Criteria per Fatigue Test Procedures of MIL-E-1 basic specifications.

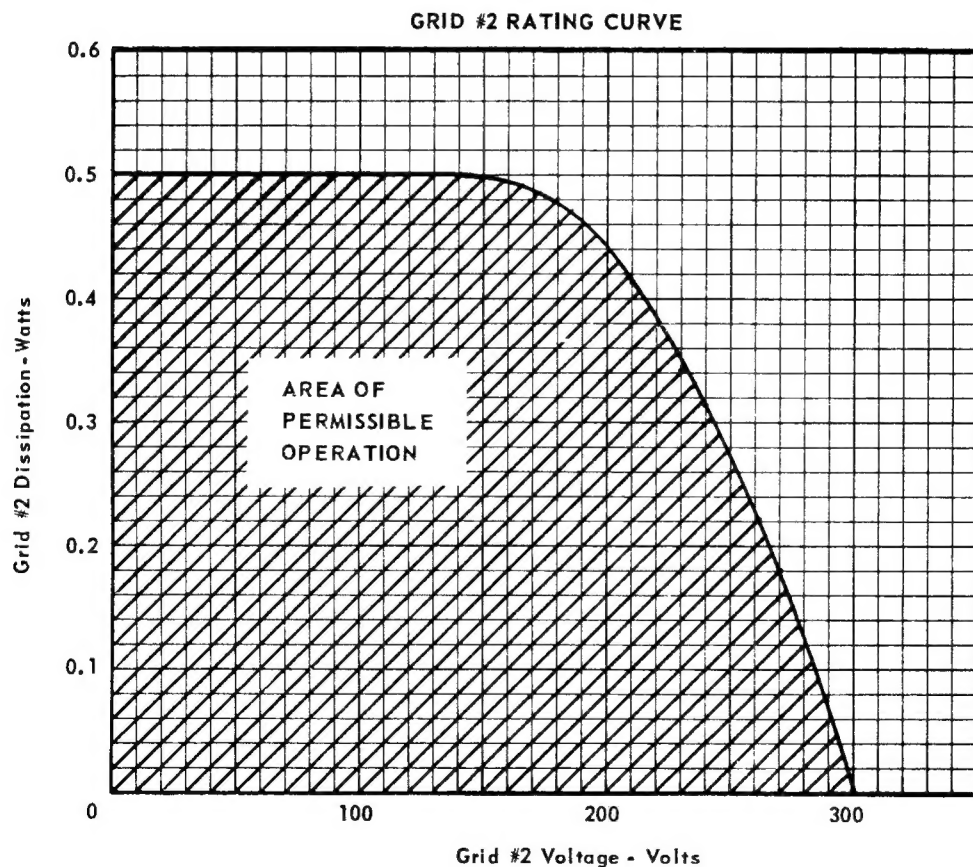


## MINIATURE PENTODE

## ELECTRICAL DATA (Cont'd.)

## NOTES (cont'd.)

- Note 4: These normal values represent conditions at which control of reliability may be expected.
- Note 5: These normal test conditions are used for all characteristic tests unless otherwise stated under the individual test item.
- Note 6: For most applications the performance will not be adversely affected by  $\pm 10\%$  heater voltage variation, but when the application can provide a closer control of heater voltage, an improvement in reliability will be realized.
- Note 7: Change of transconductance for individual tubes from that value measured at  $E_f = 6.3V$  to that value measured at  $E_f = 5.7V$ .
- Note 8: The output indicator shall be a VU meter. The three (3) milliwatt point shall be determined as a meter deflection of 25% the calibration point.
- Note 9: The cathode resistor shall be shunted with a capacitive reactance not exceeding three (3) ohms at 60 cycles.

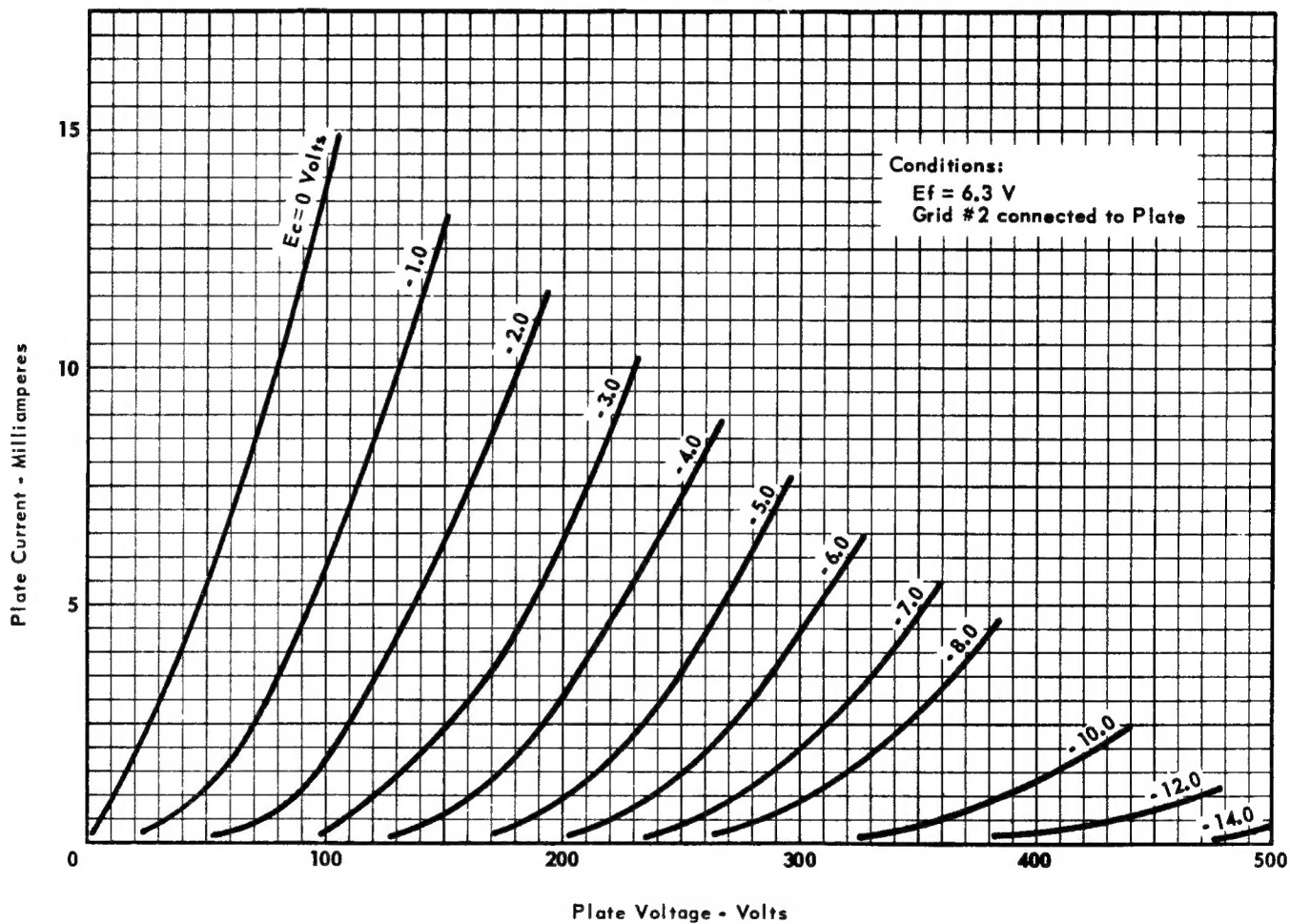


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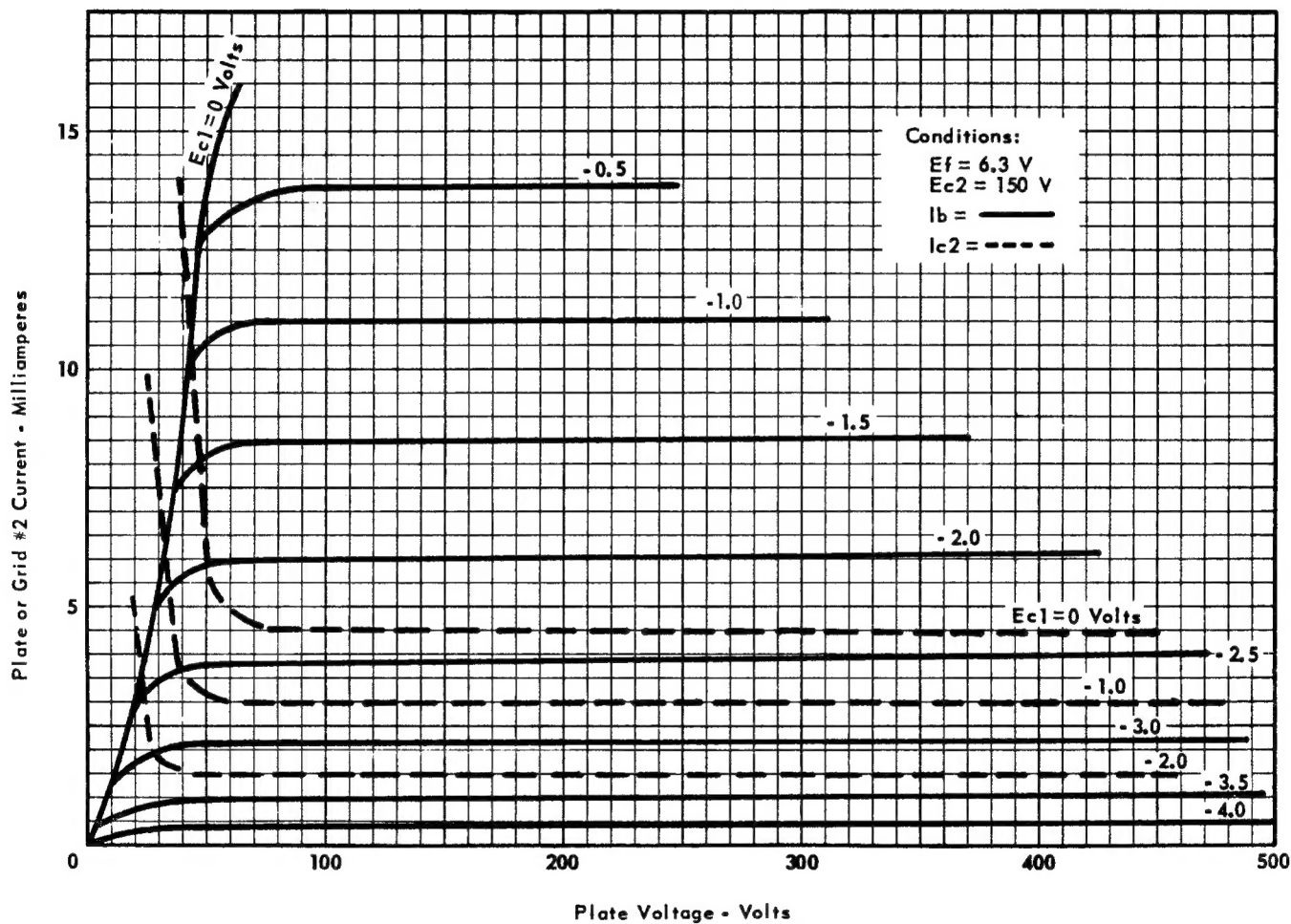
## MINIATURE PENTODE

AVERAGE PLATE CHARACTERISTICS  
(Triode Connected)



## MINIATURE PENTODE

AVERAGE PLATE CHARACTERISTICS



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